PRELIMINARY

OPERATING MANUAL

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STAT

STAT

STAT

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ILLUSTRATIONS

FIGURE 1 – LOCATION OF CONTROLS

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STAT [redacted]

STAT [redacted] OPERATING MANUAL

I GENERAL DESCRIPTION

STAT [redacted] is a film viewing table of advanced design. It incorporates many features which make the viewing and interpretation of aerial film or other transparent films faster, more efficiently, and less fatiguing to the operator.

STAT [redacted] consists basically of a transilluminated table mounted on a tilting base with provisions for mounting and spooling of film across the top. The table will accept standard spools (MS_____) of 9 1/2, 5 inch or 70mm film with lengths up to 500 feet. In the case of the 5 inch and 70mm films, two films may be viewed at the same time. The tilting base permits the viewing surface to be positioned anywhere from horizontal to 75 degrees. The instrument may also be swivelled on the base so that the axis of tilt is changed. When the equipment is used tilted about the short axis, a third handwheel is available on the back (now the left side when facing the format) for convenient control of the rear film.

Film transport is accomplished in one of a number of modes through a unique electro-mechanical drive system which allows one handwheel to be used for transporting film in both directions. A power assisted mode of operation is available which relieves the operator of most of the physical burden of transporting film. A fully automatic mode in which the handwheels are not used is also available. In this mode, the operator controls film motion by potentiometers.

Spooling of film with either the emulsion in or out is accomplished by spool drive reversing gearboxes in each drive spindle head. This allows handwheel motion to control the direction of film travel regardless of how the film is being spooled (i.e., emulsion in or out).

A coupling device is included to permit both film drives to be linked together and controlled from any one of the three handwheels. Both films may be driven in the same direction, or in opposite directions by the same control.

II DESCRIPTION OF CONTROLS

(Refer to Figure 1)

On Base

1) Power ON-OFF switch - controls all power coming into equipment.

2) Tilt Control - A momentary contact center OFF switch which controls direction of tilt. UP increases tilt; DOWN decreases tilt.

3) Fuse - All electrical power passes through this fuse. It is a type 3AGX 5 ampere.

4) Swivel Lock - A spring loaded plunger which locks the light table on base in either of two positions. Pull down to release.

On Front Panel

5) Pilot Light - Illuminated whenever main power switch is on.

6) Brightness Control - Controls general format illumination brightness. Counterclockwise rotation increases brightness. Switch actuation at limit of CCW travel increases brightness by removing completely dimming control from circuit.

7 & 8) Light Shades - 7 and 8 are thumb wheels, mechanically connected to the front and rear shades respectively. Each shade may be extended across the format to slightly beyond the middle. Control for the center shade (#17) is located at the rear right corner of the table and is described later.

9 & 10) Film Speed Controls - 9 and 10 are the controls for mechanically changing the gear ratio between the handwheels and the film spools. In the "low" position the ratio is 1:1 and in the "high" position it is 1:2.5 (spool faster). Control 9 is for the front film, and 10 for the rear. In the mid or neutral position the handwheel drive is disconnected from the spool drive.

11) Coupling Control - The coupling control lever mechanically couples the film drive systems so that any one of the three handwheels may be used to drive both films. It has three positions; in the center or "independent" position the film drives are independent, in the "same" position the films will transport in the same direction, and in the "opposite" position the films will be coupled to transport in opposite directions.

12 & 13) Slew Controls - 12 and 13 are the automatic slew controls for the front and rear films respectively. These are operative only when all three handwheels are in the disengaged positions. Their direction and angle of rotation from the center position determines the direction and speed of film transport.

14) Power Assist Switch - In the "ON" (up) position this switch activates the power assisting motors and clutches. It must be in the up position when operating in either the power assisted mode or in the fully automatic mode. In the down position there is only a direct mechanical connection between the film drive system and the corresponding handwheel.

15) Loading Switch - The loading switch deactivates (in up position) the film tensioning rollers and reduces the friction on the mechanical brakes. This is provided primarily for the purpose of loading film.

16) Control Selector Switch - This switch is always left in the "left" position except when the Coupling Control (11) is in either the "same" or "opposite" positions. With the equipment in one of these two coupled modes the Control Selector Switch selects which handwheel (or slew control knob) is to be effective in transporting film. Thus, in the coupled mode when this switch is in the "left" position the left (front film) handwheel is controlling both films and when in the "right" position the right (or rear film) handwheel is used to control both films. When in the "right" position, however, which of the rear film handwheels in operation depends on position of the Alternate Handwheel switch (18) which is described later.

It should be noted that this switch is of concern only when operating in the power-assisted or fully automatic modes of film transport. With the Power Assist (14) switch off (down) the film drives are only mechanically coupled to the handwheels, thus any handwheel is operative in the coupled mode regardless of the position of this switch.

On the Light Table

17) Center Shade Control - The center shade is positioned by rotating the control crank on the rear left side of the light table. This crank controls the position of the opaque section of a Mylar belt that travels down the center of the format. The opaque section is positioned over the format when two films are being viewed and the clear section when a single large film is being used.

Note that there are stops in the position of the belt. Since there is a friction drive, no damage can be done, ~~however, the belt will not move~~ when the stop is encountered.

18) Alternate Handwheel Switch - Located on the light table casting next to the rear left (when facing front panel) handwheel, this switch actuates this handwheel when in the up position. It is intended to be used only when the instrument is tilted up about its short axis and is being operated from the end. Actuation (up position) of this switch in effect transfers control of the rear film drive from the front right handwheel to the left rear ~~unit~~ handwheel.

19, 20 & 21) Handwheel Clutch and Interlocks - Each handwheel has two axial positions on its shaft. In the "in" (handwheel pushed in toward the casting) or engaged position, the handwheel is mechanically coupled to its respective film drive. The engaged position also causes the handwheel interlock switch to actuate which prevents the film from being transported by using the slew controls. With the handwheel in the "out" or disengaged position, it is decoupled from the film drive and is free to rotate

on the shaft. In this position the handwheel interlock switch is deactivated which, (when all three are deactivated) allows the film to be transported using the slew control knobs, while the handwheels remain stationary. This is primarily a safety feature.

NOTE: All handwheels must be in the disengaged position in order to operate in the fully automatic slew mode.

On the Film Drive Gearboxes

22) Rotation Controls - On each of the four film drive gearboxes their is a "Rotation" control. This controls the direction of rotation of the film spool relative to that of its corresponding handwheel. Thus, when the lever is set at "same", rotation of the handwheel rotates the spool in the same direction as the handwheel and when in "reverse" opposite directions occur. This feature is included to allow any combination of emulsion up or down viewing with emulsion in or out spooling.

23) Drive Spindle Lock - On each of the four driving spindles there is a locking device which locks the spindle in one of two positions. For loading film the spindle center button is depressed and the spindle withdrawn until it locks in its "out" position. When the film is loaded, the button is depressed and the spindle driving dog allowed to enter the film spool until the "in" detent position is reached where upon the button pops out and the spindle is prevented from moving axially.

24) Drive Gearbox Position Lock - On each of the four drive gearboxes there is a thumbscrew type locking device which holds the gearbox in the proper position for the different film spool sizes. Detents are provided on the guide rods for the most common film widths of 9 1/2 inch, 5 inch and 70mm. Other film widths may be used by disregarding the position of the detents. In these other cases care should be exercised to prevent excessive tightening of the thumbscrews since they could be clamping outside of the detent area.

25) Center Support Lock - The center spool supports located at either end of the table have thumbscrew type locks. Detented positions are provided on the guide rod for the common film spool widths, although other spool widths may be accommodated by clamping outside the detents. Care should be exercised in such cases not to excessively tighten the thumbscrews.

III OPERATING EQUIPMENT

A) Setting up for Operation

1) Physical Handling of Instrument

The unit may be carried by two people by lifting on the underside of the light table. Do not lift by the handwheels, gearbox guide rods, or film rollers. The unit is most easily lifted when the viewing surface is horizontal. When in the rear vertical position (~~x~~ tilted about short axis) the unit may be carried by two people lifting on the underside of the tilting base.

~~X~~ 2) Positioning on Table

STAT [ ] is designed to be used on a table of normal or lower height. It should be positioned so that the edge of the base plate comes right to the front edge of the supporting surface. This position allows handwheels to clear table top when instrument is tilted about long axis to 45 degrees. Do not let the front edge of the base plate extend over the edge of the table otherwise the stability of the instrument may be jeopardized when it is erected to its near-vertical position.

3) Applying Power

All power is obtained from the conventional 115 volt, 60 cps single phase supply. The instrument is supplied with a power cord and common three wire grounded plug. The ground wire is connected to the frame of the instrument to prevent accidental shocks in the event of an electrical malfunction.

The equipment is fused at 5 amperes with a ~~xxxx~~ standard 3AGX 5 ampere buss fuse (3).

Plug equipment into properly wired outlet and set SLEW control knob (12 + 13 ^) pointers to their reference marks. Turn on Power Switch (1), pilot light (5) should glow indicating power is being supplied to the equipment. No warmup time is required before operation.

B) Orientation of Format

The light table is mounted on a base which provides two degrees of freedom in the orientation of the viewing format. The base tilts forward and may be adjusted at any angle from horizontal to 75 degrees although when the table is in one position (long axis parallel to edge of support table) the angle of tilt should be limited to approximately 45 degrees because of interference between handwheels and table.

The light table may also be pivoted through 90 degrees on the base assembly to allow the short dimension to be paralled to the edge of the table. The Swivel Lock (4) provides a positive lock in either of these two positions. In addition, there are mechanical stops to prevent the light table from grossly exceeding its swivel limits.

To adjust the table for viewing, withdraw spring loaded Swivel Lock (4) pin by pulling down and swivel table to desired viewing orientation. Make sure Swivel Lock snaps into the locked position. Turn on power (1) and actuate Tilt Control (2) in direction of desired tilt. This is a spring centered switch and must be held in position for as long as one wishes the tilt

angle to increase (or decrease). Releasing the switch stops the tilt motor and locks the tilt mechanism. No additional supports or stays are necessary, nor are any provided.

The tilting mechanism is capable of providing up to 75 degrees of tilt with both mechanical stops and electrical limit switches preventing overtravel. However, the operator should be aware of the following limitations:

1) Maximum angle of tilt when the long dimension of format is parallel to the tilt axis is approximately 45 degrees. When tilting the table up in this condition the operator should continuously observe the clearance between the handwheels and the edge of the support table. If the edge of the instrument base is not in line with the edge of the table the angle of tilt will have to be kept at even less than 45 degrees.

2) Make sure that edge of base does not overhang edge of table when tilting to high angles when the short dimension of the format is parallel to the axis of tilt. The reason for this is to prevent the instrument from becoming unstable and falling off the front of the table. In this mode of tilt, the operator should also observe the clearances between the instrument including film spools and the edge of the table.

C) Film Loading

1) Loading Film Spools

Set the spool drive gearboxes and the center support

for the film (or films) to be viewed. Notice that the detents in the guide support rods are for the most common film sizes and combinations (i.e., 9 1/2, 5 inch and 70mm). The detents establish the support and gear box positions only approximately and some adjustment may be necessary within the detent freedom to insure the Spindle Lock (23) ~~is set~~ when the spool is in place. One simple way of doing this is to hold up an empty spool, so that its outer rim acts as a gauge, between the drive and idler spindles before attempting to put full spools in place. Note, that for the spindle to be locked-in, the Spindle Lock (23) button must be in the out position.

The detents on the guide bars are ~~xxx~~ arranged so that the front spindle drive gearboxes are used when a 9 1/2 inch film is ~~used~~, the center support being pushed to the rear of the unit. When smaller films are used (one or two) the center idler spindle is placed in the middle of the guide bar. This insures that the center shade will be in the proper position.

Although detents have been provided to serve as a guide and prevent the locking ~~x~~thumbscrews from marring the guide rod after long use, it is possible to use other than the detent positions for different sized film as long as the operator does not tighten the locking thumbscrews excessively.

2) Setting Rotation Controls

The Rotation Controls (22) on each gearbox are set in either the "same" or "reverse" position depending on whether the operator wants to view the film with the emulsion up or down, whether the film is spooled emulsion in or out, and how the operator wants the emulsion wound, in or out. Any combination is possible. The terms "same" and "reverse" indicate the relative direction of rotation of the film spool with respect to the handwheel.

Some resistance may be encountered in engaging the gears, which may require the operator to rotate the film spool or handwheel slightly to mesh the gears.

3) Film Threading

To thread film, after spools have been loaded and gearbox rotations set, put Loading switch (15) in up position. This will deactivate the tensioning rollers permitting film to be threaded under.

The film is threaded over the upper rollers and down and under the tensioning rollers across the viewing surface and through the reverse sequence on the other side to the take-up spool. This path is the same regardless of ~~which side (top or bottom) the film is being wound~~ how the film is wound on the spool.

D) Illumination Control

The brightness of the cold cathode light source is controlled by the "Brightness" control (6) on the front panel. Counterclockwise rotation of the control knob increases the brightness. A switch coupled to operate at the end of the counterclockwise rotation increases the brightness to maximum by shorting out the regular dimming control.

E) Shade Adjustment

The equipment is equipped with three shades. Two move from either side of the format toward the center. These are mechanically positioned by the thumbwheel controls (7 and 8) on the front panel. The third shade is a partly opaque partly transparent Mylar tape running down the center of the format. This shade is used when two films are being viewed and it is desired to block out the illuminated strip between. The control (17) is a crank located at the rear left side of the light table casting. Note, that there is a mechanical stop on the tape, however, a friction prevents damage to mechanism or tape when the stop is encountered.

F) Transporting Film

The transporting of film may be accomplished either with the handwheels or with the Slew controls (12 and 13). The description of these various modes of operation is first presented for the mode in which the films are independently controlled (i.e., Film Coupling lever (11) is in the "independent" position) and then for the mode during which the film transport mechanisms are coupled together.

NOTE that for all operations with the Film Coupling ~~switch~~ set in the "independent" position, the Control Selector switch should be in the "left" position.

1) Independent mode (Film Coupling lever in "independent" position)

a) Manual Mode (Independent drive)

In the manual mode of operation, the Power Assist switch ( ) should be off (down). The handwheel corresponding to the film to be transported should be engaged (pushed in toward the casting).

The handwheel is turned in the direction the operator wishes to move the film. About 45 degrees of motion is required before the handwheel engages a stop which produces a direct mechanical connection between the handwheel and the film drive mechanism. This motion is necessary for proper operation when in the power driving modes.

Although the films are being transported purely mechanically in this mode the electronic circuitry is still active in sensing handwheel motion and raising the tensioning rollers.

The Film Speed control (9 or 10) must be set in the "high" or "low" position according to the speed at which the operator desires to transport film. It should be noted that the amount of load torque reflected to the handwheel will depend markedly on the relative amounts of film on the spools and the direction in which film is being transported.

b) Power Assist Mode (Independent drive)

In the power assist mode of operation, the Power Assist switch ( ) must be on (up) and the handwheel, corresponding to the film to be transported, must be in the engaged position (pushed in toward the casting). Turning the handwheel will cause the tensioning rollers to raise and the film to be transported in the same direction.

The proper Film Speed control (9 or 10) must be set in either the "high" or "low" position, depending on desired speed of film transport. In general, it has been found that the most satisfactory position for general operation is in the "low" position.

The control Selector switch should be in the LEFT position.

When driving the rear film, the position of the Alternate Handwheel switch ( ) should be kept in mind. With this switch in the OFF (or down) position the front left handwheel is used to control the rear film. With the switch in the ON (or up) position the back left handwheel is activated.

c) Automatic Slew Mode (Independent Drive)

In the automatic slew mode of operation, film may be transported using only the SLEW Control ( ) knobs. The POWER ASSIST switch (14) must be on (up) and all handwheels must be pulled out disengaging their clutches and deactivating the Interlock switches (19,20,21). The Film SPEED lever should be set in the HIGH or LOW positions, the LOW being the position normally preferred.

The film may now be transported by rotating the SLEW control (12,13) in the desired direction of travel. The tensioning rollers will automatically raise as the film starts to move and will return to their down position after the film has stopped (2 second time delay) and the pointer on the control knob is pointing to the reference point. Ordinarily, it is not necessary to refer visually to the knob setting, the operator should soon acquire the "feel" of the control and know when it is in the middle or OFF position.

NOTE, that when driving the films independently, the CONTROL SELECTOR switch (16) should always be in the LEFT position.

2) Coupled Mode (Coupling Lever (11) in same or opposite positions)

a) Manual Mode (Coupled Drive)

In the manual mode of operation with the COUPLING lever (11) set at same or opposite, the film drives are coupled together, thus interconnecting all three handwheels.

Any of the three handwheels may be used to control both films. Mechanically engaged the handwheel by pushing in and rotate in direction of desired film travel. If COUPLING lever (11) is set at SAME, films will transport in same direction and in opposite directions if set at OPPOSITE. The relative speeds of film transport will depend on the amounts of film on the spools and consequently, may not be the same.

The film SPEED levers (9 & 10) should be set to HIGH or LOW depending on desired speed of film transport. However, since two films are being transported the torque required may be considerable when in the HIGH position.

A small amount of lost motion may be felt when turning the handwheel before the film starts to transport. This is a characteristic of the design; this motion is necessary for proper operation when using the power assist feature.

Although the film is transported completely mechanically in this mode of operation, the electronic controls still raise and lower the tensioning rollers as the film is transported.

b) Power Assisted Mode (Coupled Drive)

To use the power assist feature in the coupled mode the POWER ASSIST switch (14) must be on (up) and the handwheel which is to be used must be mechanically engaged by pressing it in toward the casting. Now, any one of the three handwheels may be used to transport both films; the handwheel which has control of the film transport servo motor is selected by the CONTROL SELECTOR switch (16) and the Alternate handwheel switch (18). With the CONTROL SELECTOR switch in the LEFT position, the left front handwheel is the only active control. With the CONTROL SELECTOR switch in the RIGHT position, the film controlled to either of the two handwheels normally associated with the rear film (i.e., front right and rear left). Which of these two handwheenls is active depends on the position of the Alternate Handwheel switch (18) next to the rear handwheel. When this switch is in the off (down) position the front right handwheel is active, and when this switch is on (up) the rear left handwheel is in control of film transport.

The REAR and FRONT SPEED levers (9+10) should be set in the HIGH or LOW positions, depending on desired speed of film transport. However, the operator should keep in mind that during the coupled mode of operation both films are being transported by a single film drive motor, and depending on the

relative amounts of film on the spools and the direction of film transport it is possible to get a condition where considerable load torque is reflected to the handwheel. This, when in the coupled mode it is generally advisable to keep the SPEED levers (9 & 10) set in the LOW positions.

If the LOADING switch (15) is down, the tensioning rollers will automatically be raised and lowered as the films are transported.

c) Automatic Mode (Coupled Drive)

The automatic mode of operation is activated when all three handwheels are mechanically disengaged (pulled out). Either of the SLEW controls may be used to transport the films; the control which is active depends on the position of the CONTROL SELECTOR switch (16). With the CONTROL SELECTOR in the LEFT position, the left or FRONT SLEW control (12) is active. When the CONTROL SELECTOR is in the RIGHT position, the right or REAR SLEW control (13) is active.

The operator should set the SLEW controls (12 & 13) to their center positions before disengaging all three handwheels (thus going into automatic mode) to prevent the films from unexpectedly starting to move. NOTE, that the tensioning rollers will automatically be raised (assuming LOADING switch (15) is in down position) when the film starts to move and will be lowered when the pointer on the control knob is returned to the center position mark. Ordinarily, it is not necessary for the operator to visually refer to the position of the control knob; the oper-

ator should soon acquire the "feel" of the control and know when it is in the middle or off position.